

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

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For: THREAD-SUPPLYING DEVICE FOR
TEXTILE MACHINES

AMENDMENTS TO SPECIFICATION, CLAIMS, AND ABSTRACT
MADE VIA PRELIMINARY AMENDMENT

IN THE TITLE:

Replace the title with the following:

THREAD-SUPPLYING DEVICE FOR TEXTILE MACHINES

IN THE SPECIFICATION:

At page 1, after the title, insert the following heading:

FIELD OF THE INVENTION

Amendments to the paragraph beginning at page 1, line 3:

The invention relates to a yarn feeder [having the characteristics of the preamble to claim 1, 2 or 3].

At page 1, after line 4, insert the following heading:

BACKGROUND OF THE INVENTION

Amendments to the paragraphs beginning at page 1, line 5 as follows:

Yarn feeders commonly are vendor supplied parts or accessories for textile machines and particularly in loop-forming textile machines are often found in great numbers thereon. The yarn feeders each feed one yarn to a yarn-using station, such as a

knitting station. The quality of the knitted goods produced depends decisively on the precision and reliability of the yarn feeders. On the one hand, this [makes] demands [in terms of] precision manufacture - yet on the other hand, the yarn feeders should be as simply embodied, economical, and simple to make and maintain as possible. Furthermore, they must [reliably] perform reliably [their function] even if [they are] operated for relatively long periods without special maintenance and in particular without cleaning. Deposits of dust or fluff must not impair operation.

The goal [is] also is to design a yarn feeder such that it can be adapted in a simple way to different kinds of use.

Amendments to the paragraphs beginning on page 1, line 34:

A yarn brake and a plurality of yarn guide elements are disposed upstream of the yarn guide drum. Further yarn guide elements are disposed downstream of the yarn guide drum. In addition, a shutoff lever and a yarn feeler lever are pivotably supported on the housing and actuate switches disposed in the interior of the housing in order to indicate a yarn break and to shut off the textile machine if necessary. For contacting a suitable electric line, connection means are provided on the fastening device, from which means electric lines lead to the appropriate switches in the interior of the housing. A signal light [is] also is disposed on the yarn feeder and signals an error state accordingly.

[These] Such yarn feeders have proven themselves in practice. However, they [require a certain expense for production] can be expensive to manufacture.

Page 2, after line 9, insert the following:

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the invention to provide a reliably operable yarn feeder that can be more simply and economically produced.

The invention is carried out by a yarn feeder which has a plastic housing with a fastening clamp specially designed to withstand clamping forces.

Amendments to the paragraphs beginning at page 2, line 10, to page 4, line 7:

[It is the object of the invention to reduce this expense.

This object is attained by a yarn feeder that has the characteristics of claim 1, 2 or 3.

In its embodiment according to claims 1 and 2, the yarn feeder has a plastic housing. The fastening clamp is also embodied of plastic.] The special design of the fastening clamp [according to claim 1 or 2 allows such a narrow design of this clamp,] permits the clamp to have a narrow profile with the required stiffness and strength[,] that [the] retaining devices can be mounted on [the] a retaining ring of a textile machine without the fastening clamps being a hindrance to each other. To that end, the invention provides on the one hand the possibility of embodying [the] a jaw-like clamp on or in a box [profile]-like housing portion. Alternatively, the jaw- like clamp can be provided with reinforcement ribs[,] on its side pointing away from the jaw, which also furnish the desired strength if they extend [relatively far upward] upwardly sufficiently, or in other words away from the retaining ring of the textile machine. On the textile machines, the spacing between the retaining ring and a drive belt for driving the yarn feeders is usually structurally specified by the construction [and defined uniformly]. It has been found that the reinforcing ribs are adequately large if, viewed from the retaining ring, they protrude past the plane defined by the lower edge of the belt. In this way, it becomes possible for [the] yarn feeders with the yarn guide drum, which are used to feed the yarns, for instance to knitting stations of a circular knitting machine and which must be relatively narrow in structure, to be [embodied] formed of plastic with [regard to] the housing of the fastening clamp. The [not inconsiderable] significant forces that [in particular] can be incurred by [engage the] yarn feeders [and are caused] by the revolving drive belt are thus reliably absorbed and dissipated.

The yarn feeder, [according to claim 3, has] more particularly, may have a housing with at least 2 housing parts, each of which has [one] a respective bearing means for the continuous shaft. Thus both housing parts, embodied in clamshell fashion, jointly conduct the incident support forces of the bearing means to the fastening device and thus to the textile machine, which acts as a stationary bearing for the yarn feeder. This in turn makes it possible to divide the housing over a large area[,] so that in the dismantled state, unhindered access to the housing interior is possible. Once the two housing parts are put together, they are joined [together positionally] correctly by a connecting means, and as a

result the housing is closed. Assembly is relatively quite uncomplicated. The dividing seam between the housing parts [is] preferably is disposed substantially horizontally or slightly inclined, so that at least outside the fastening device, it extends along the side faces of the housing. This makes the interior of the housing parts easily accessible. [In] During assembly, parts to be disposed in the interior can simply be introduced into it. This further simplifies assembly.

As [the] bearing means, ball bearings are preferably provided, which are received in appropriate bearing seats of the housing parts. [As the] For bearing seats, tubular extensions can for instance be provided, which are [embodied] formed on the housing parts and extend outward away from them. The ball bearings are preferably introduced from outside into the bearing seats. In a preferred embodiment, the lower bearing seat, toward the yarn guide drum, extends into the yarn guide drum. This [maximized] enhances the spacing between the two ball bearings, resulting in good support of the shaft with little play. To drive the shaft and the yarn guide drum, a plurality of toothed-belt pulleys or other kinds of pulleys can be disposed on the other end of the shaft as needed, with a belt traveling along the pulleys. The resultant support forces on the ball bearing are readily absorbed by [the] a wide support spacing. Also by means of the bearing seat extending into the yarn guide drum, [it is attained that] in the event of an error a yarn will not be wound onto the shaft, and this increases the operational safety.

At page 5, after line 36 insert the following:

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

Delete the paragraphs beginning at page 5, line 37 to page 8, line 40 and insert the following:

FIGURE 1 is a side elevational view of an illustrative yarn feeder embodying the present invention;

FIG. 2 is an enlarged perspective of the yarn feeder shown in FIG. 1;

FIG. 3 is a diagrammatic depiction of a plurality of yarn feeders, such as shown in FIGS. 1 and 2, disposed on a retaining ring of a textile machine;

FIG. 4 is a side elevational view of an alternative embodiment of yarn feeder embodying the present invention;

FIG. 5 is an enlarged vertical section of the yarn feeder shown in FIG. 4;

FIG. 6 is a perspective of a first or lower housing part of a yarn feeder such as shown in FIGS. 1 or 3;

FIG. 7 is a side view of the housing part shown in FIG. 6;

FIG. 8 is a perspective of a second or upper housing part of the yarn feeder such as shown in FIGS. 1 and 3;

FIG. 9 is an end view of the yarn feeder housing;

FIG. 10 is a side elevational view of the housing of the yarn feeder, shown in partial section in the region of the fastening clamp thereof;

FIG. 11 is a perspective of a yarn brake adapted for mounting on the housing of the illustrated yarn feeder;

FIG. 12 is a perspective of a coupling clamping device for fastening fixtures to the yarn feeder;

FIG. 13 is a perspective of a cover cap for the coupling device shown in FIG. 12;
and

FIG. 14 is a perspective of an alternative embodiment of fastening device for the yarn feeder.

While the invention is susceptible of various modifications and alternative constructions, certain illustrated embodiments thereof have been shown in the drawings and will be described below in detail. It should be understood, however, that there is no intention to limit the invention to the specific forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions and equivalents falling within the spirit and scope of the invention.

At page 6, after line 29, insert the following heading:

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

(EXC
NT.)

Amendments to the paragraphs beginning at page 6, line 30 to page 8, line 39:

Referring now more particularly to FIGS. 1 and 2 of the drawings, there is shown an illustrative yarn feeder 1 embodying the present invention adapted for feeding [Figs. 1 and 2 each show a yarn feeder 1 of the invention, in a side view and a perspective view, respectively. The yarn feeder 1 serves to feed] a yarn 2 to a textile-processing machine, such. as a knitting machine. The yarn feeder 1 has a housing 3, which serves as a basic carrier for all the elements of the yarn feeder 1. On one end, the housing 3 is provided with a fastening device 4, which is arranged to support and secure the yarn feeder 1 on a suitable retainer 5, such as a rail or a ring of the textile machine, as depicted[. One such retaining device 5 on the machine is shown] in Fig. 3. By way of example, [it is formed in a known manner by a] the ring [of] my have a rectangular cross section and an electric connection cable laid along its outside. A belt 5a serves to drive all the yarn feeders 1.

As shown in Fig. 5 (in conjunction with a slightly modified embodiment), [the housing is penetrated by] a vertically disposed shaft 6[, which] is rotatably supported in the housing 3 [and disposed approximately vertically]. For bearing purposes, two ball bearings 7, 8 are used, which are held in respective bearing seats 9, 10 of the housing 3.

The shaft 6 on its lower end has a yarn guide drum 12, around which the yarn 2 is wrapped once or multiple times. The yarn guide drum 12 is carried and driven by the shaft 6. To that end, the shaft 6 on its upper end has one or more toothed-belt pulleys 14, 15, which in this case are [supported] rotatably supported on the shaft 6 by ball bearings 16, 17 [in the present exemplary embodiments].

The toothed-belt pulley 14 meshes with the belt 5a, whose lower edge is [suggested] depicted in Fig. 5 by a dot-dashed line. Between the toothed-belt pulleys 14, 15, a displaceable coupling disk 18 is disposed. On both of its flat sides, the disk has toothed coupling rings 21, 22, with which the toothed-belt pulleys 14, 15 can be coupled alternatively with the shaft 6 and thus serve as a drive device for the shaft. The coupling disk 18 is provided with coupling prongs for this purpose.

The housing 3 is preferably constructed in multiple parts. In that case it first has a lower housing part 25, which is shown separately in Figs. 6 and 7. The housing part 55 is a substantially clamshell-like injection molded cart. For forming the fastening device 4, the housing part 25 has a portion 26 in the form of a U in side view, whose jaw opens

downward and whose inner contour is adapted [to] for receiving a fastening rail (retaining device) on the machine. On the legs 26a that define the jaw, lateral protrusions 27 are provided for transmitting an outward-oriented force, which spreads the jaw wider, to the other mating housing cart 33. Thus the leg 26a is the leg that is primarily supported on the retaining device and in turn on a corresponding leg of the housing part 33 (Fig. 9). On the opposite side of the jaw, the conditions are reversed. The leg 26b on that side is supported secondarily, or in other words indirectly on the retaining device. Support cleats 28 act as abutments for corresponding parts (82, Fig. 9) of the corresponding leg of the housing part 33, which comes directly (primarily) into contact with the retaining device.

The fastening device 4 [embodied] is formed on the housing 3 [is embodied] as a fastening clamp by the housing 3; for that purpose, no force-[observing] carrying elements, reinforcing elements or the like of any kind made of material extraneous to the housing are provided. The cross section of the housing 3 in the region of the fastening device 4 can be seen in Fig. 10. The upper housing part 33 and the lower housing part 25 together define a hollow profile, approximating [which is embodied approximately in the manner of] a box profile. [It] The housing 3 can be put together in such a way that the housing part 25, which in the section shown in Fig. 10 is approximately flat, has the upper housing part 33, which here is U-shaped fitting over it. in the interior enclosed by them, reinforcement ribs 33a, 33b, 33c can be provided. As needed, these ribs can also fill the interior almost entirely or entirely. However, relatively narrow ribs, of the kind also seen in Fig. 8, are preferred. The somewhat wider middle rib 33b can, as seen in Fig. 8, in turn be divided into ribs, so that an overly large plastic volume does not occur at any point of the housing part 33[. Overly] excessively great material thickness can thus be avoided.

The hollow profile-like embodiment of the clamp, formed by the two housing parts 25, 33, and the optionally provided inner ribs 33a, 33b, 33c assure adequate rigidity of the fastening device 4 with respect to forces [having the] which have a tendency to spread the jaw wider. The fastening device 4 can thus be made so narrow that it does not protrude laterally past the yarn feeder, or does so at most only slightly, so that as shown in Fig. 3 the yarn feeders 1 have space side by side on the retaining ring 5.

Amendments to the paragraphs beginning at page 9, line 12 to page 10, line 23:

As seen from Fig. 6, at least two metal strips 33, 39, are placed in suitable receptacles in the housing part 25[; they] and are retained in corresponding slits. The metal strip 38, which is in the form of [embodied as] a U-shaped hoop, is for instance connected to ground potential and has notches 41, 42, 43, 44 for the pivotable bearing of an inlet-side yarn feeler 45 and an outlet-side yarn feeler 46 and also has an eyelet 47, in order to make a ground connection with external fixtures. This connection is made particularly [to] with fixtures that come into contact with the yarn 2. Other stationary or moving yarn guide elements may, but need not, be grounded.

The metal strip 39 may lead to switches 48, 49, actuated by the yarn feelers 45, 46, of two separate shutoff current circuits. On its end remote from the switches 48, 49, [it may be embodied as] the strip may define a clamp contact for an electronic component 51. This component may in turn be connected by its other end to a clamp contact of a further conductor 52. For contacting a line provided on the retainer on the machine, windows 53, 54 extending in the region of the fastening device 4 into the housing interior are provided, through which connection elements can reach. In the vicinity of the fastening device, a single indicator light 50 for both shutoff current circuits is disposed, which lights up as soon as one of the switches 48, 49 is actuated, or in other words as soon as one of the yarn sensors has been pivoted downward. The indicator light is inserted into a stamped conductor track.

The upper housing part 33 [can be seen from] is depicted in Figs. 8 and 9[. It is embodied in] has clamshell [fashion] shape and in its interior, it has hollow pegs 61, 62 for receiving the pegs 34, 35 of the lower housing part 25. A recess 63 of circular cross section is provided for receiving the hollow peg 36, and a threaded bore for a fastening screw 64 (see Fig. 5) is provided on its bottom. The bottom is formed, as will be explained hereinafter, by a part [that belongs to] of a coupling device. For adjusting the housing parts 33, 25, and [in particular] particularly to attain adequate alignment of the ball bearings 7, 8 with one another, a suitable seat is embodied in the housing part 33 in order to receive the tubular extension 32. This seat is formed substantially by a stepped bore which is capable of receiving the upper end, [embodied] formed somewhat conically if needed, [of] to the tubular extension 32. For low-play or play-free centering of the free end of the extension 32, axially oriented ribs 66 may be disposed on the circumference of

the approximately cylindrical outer surface of the seat 65. On the outside of the housing part 33, the bearing seat 9 is embodied, coaxially to the seat 65 on the inside.

Amendments to the paragraphs beginning at page 10, line 35 to page 12, line 18:

In the housing 3, and in the present exemplary embodiment in the housing part 33, a feeler barrier 71 is supported longitudinally displaceably[; it] as can be seen from Figs. 1, 8 and 9. It is formed by a sheet-metal strip whose free end, embodied as a handle 72, protrudes out of the housing part 33. To that end, a depression 73 visible in Fig. 1 is [embodied] formed on the housing part 33, and an angled end of the feeler barrier 71 is disposed in the depression. The feeler barrier 71 is displaceably supported and is profiled in such a way that it pivots first one feeler lever (45) and then the other feeler lever (46) from a freely downward-hanging position into an upper position upon actuation.

As seen particularly from Fig. 12, a jaw-like portion 80 of [is embodied on] the fastening device [4 of the] housing part 33 and can fit over the portion 26 of the lower housing part 25. It has a rear bearing depression 81, into which the protrusions 27 (Fig. 7) off the lower housing part 25 can move. On the opposite side, conversely, a bearing region 82 is formed, which is braced on the support cleats 28 of the lower housing part 25, when it is urged in the region that stretches the jaw open.

Between the housing parts 25, 33, an approximately horizontal dividing seam 83 is formed. The housing parts 25, 33 fit in one another here. Approximately in a rectilinear extension of the dividing seam 83, in the region of the fastening device 4, a coupling clamping device 84 is formed, which is shown separately in Fig. 12[. It is] as a component of the upper housing part 33 [and can be seen in Fig. 12]. It is termed by a flat guide plate 86, connected to the housing part via ribs 85, and its free end has a female-threaded hollow peg 87, which forms the bottom of the recess 63. The hollow peg 87 is carried by the guide plate 36 and protrudes freely into the recess 63. The fastening screw 64 is seated in the hollow peg 37 and holds the two housing parts 25, 33 together, and once it is tightened it deforms the guide plate 85 somewhat. A foot 187, slipped onto the guide plate and having a shape complimentary to the guide plate is firmly clamped thereby. The foot 187 has two cleats 188, 139, which fit with little play into the interstice between the guide plate and the adjacent housing face period. When the guide plate 86 is

deformed, the foot 187 clamps. In Fig. 4 and Fig. 9, a cover cap 89 is thereby retained; this cap [is] being shown separately in Fig. 13. As needed, however, this cap can be removed and replaced with a retaining hoop 90, as shown in Fig. 1 or Fig. 2. By way of example, the retaining hoop can carry yarn guide means, such as a tubule 91. The retainer hoop 90 can fit over the toothed-belt pulleys 14, 15[. Its] with its clamping retainer [is] being disposed in the immediate vicinity of the fastening 4.

For secure fastening of the ball bearings 7, 8 and the bearing seats 9, 10, elastomer elements are disposed between the respective ball bearings 7, 8 and the bearing seat 9, 10. The bearing seats 9, 10 preferably are provided on the inside with [preferably] longitudinal ribs or regions protruding in other ways, so that the elastomer elements, in the region off the longitudinal ribs, are compressed somewhat between the outer bearing ring and the rib. The elastomer elements have a compensatory effect for temperature changes, shrinking from aging, and production variations.

Amendments to the paragraphs beginning at page 12, line 31 to page 13, line 20:

While the yarn guide element 96 is embodied as a hook and is retained non-displaceably, the yarn guide eyelet 97 may be adjustable [is preferably embodied adjustably], as an antifilamentation device. For instance, the yarn guide eyelet 97 may be embodied as a wire hoop, whose two ends have a foot that is [supported] displaceably supported on the housing 3. To that end, the lower housing part has one pocket 98, visible in Fig. 8, on both sides, the pocket having vertical end faces. The upper housing part 33 (Fig. 8) has cheeks 101, 102, which are associated with the pockets 98 and are profiled on their inside in such a way that on both sides of the pockets 98 they have guide grooves 103, 104, into which the wire hoop can snap. For adjustment purposes, the hoop can thus be compressed and transferred out of the guide groove 103 into the guide groove 104, and vice versa. The lower free end of the hoop, forming an eyelet, can thus be transferred front a first position, in which it is located virtually at the same level as the lower rim or the yarn guide drum but spaced apart from this drum, to a second position in which it is located relatively far below the lower rim but horizontally closer to it.

Optionally, a yarn brake 105, which may be driven, is provided on the yarn feeder 1. As needed, a non-driven yarn brake can also be provided. The yarn brake 105

has two rings 106, 107, visible particularly from Fig. 11, which each have one inner and one outer rim; the rims of the two rings 106, 107 are curved away from one another. Permanent magnets 108 [tense] urge the rings 106, 107 elastically against one another.

Amendments to the paragraph at page 13, line 27:

The wire hoop 112 has two hoops 116, 117, which carry the guide element 111 and the rings 106, 107. The legs are supported longitudinally displaceably in a guide part 118. The leg 117 has an end bent inward, that is, toward the rings 106, 107, on which end an intermediate element 120 is held, being braced on the guide element 118 via a helical spring 119 or other kind of spring. The other leg 116 is approximately aligned with the free end of the leg 117 but is bent away from it. The end has a tappet 121, which [may] also may be formed by a cap-shaped plastic part.

Amendments to the paragraphs beginning at page 16, line 20 to page 17, line 7:

A modified embodiment of the yarn feeder 1 is shown in Fig. 4. It differs from the above-described yarn feeder 1 in terms of the embodiment of the fastening device 4. The fastening device is provided, on the side remote from the jaw, with reinforcing ribs 33a', 33b', 33c', which belong to the housing part 33 and whose special feature is that they protrude front the level that is defined by the lower edge of the drive belt [and is suggested in] as indicated in the dot-dashed lines Fig. 14. The wall thickness of the ribs 33a', 33b', 33c' is overly great and is substantially less than their respective height. This makes the fastening device 4 so resistant to widening forces that it is possible to dispense with introduction elements, metal inlays or other stiffening additional elements in the clams. Only the nut 140 visible in Fig. 5 is needed. Other metal elements can be omitted.

[The] From the foregoing, it can be seen that the yarn feeder 1 of the invention has a plastic housing 3, preferably made of two clamshells. For connection to a retainer on the machine, a fastening device 4 is provided that also is made of plastic. The fastening device 4 is made rigid by suitable shaping which may eliminate the necessity for [and makes do without] metal inlays. The two halves of the housing each have one bearing for a continuous shaft, which on one end carries a yarn guide drum and on its other end carries pulleys 14, 15, for instance, as a drive device. Fastening means serve to